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CLAIMS:

1. A method for forming a silicon-on-insulator (SOI) photodiode optical monitoring system, comprising:

providing a plurality of SOI photodiodes (10; 30), wherein each SOI photodiode
5 includes a silicon substrate (12; 32), a buried oxide layer (14; 34) formed on the silicon substrate, and a silicon layer (16; 36) formed on the buried oxide layer, and wherein the silicon layer of each SOI photodiode has a different thickness;
determining a proportion of incident light passing through each SOI photodiode (10; 30) to the silicon substrate (12; 32) with respect to wavelength and the thickness of the
10 silicon layer (16; 36); and
calculating color component intensities of the incident light based on the determined proportions.

2. The method of claim 1, wherein each SOI photodiode (10; 30) further comprises a field
15 oxide layer (18; 38) on the silicon layer (16; 36), and wherein the different thickness of the silicon layer of each SOI photodiode is provided by varying a thickness of the field oxide layer.

3. The method of claim 1, wherein the silicon substrate (12; 32) is doped with a dopant of a first type, and wherein each SOI photodiode (10; 30) is formed by:
20 forming a trench (20; 40) through the silicon layer (16; 36) and the buried oxide layer (14; 34) to expose a portion of the silicon substrate;
doping the exposed portion of the silicon substrate with a dopant of a second type to form a pn-junction; and
forming a contact (24, 44) in the trench.

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4. The method of claim 3, wherein the contact (24; 44) forms an aperture (26; 46) of the SOI photodiode (10; 30).
- 5 5. The method of claim 1, wherein the proportion of incident light is given by $e^{-a_{\lambda}x}$, where a_{λ} is an absorption coefficient of the silicon layer (16; 36) and x is the thickness of the silicon layer.
6. The method of claim 1, further comprising:
- 10 forming a vertical pn-junction in the silicon substrate (32).
7. The method of claim 6, wherein each SOI photodiode (30) is formed by:
- forming a trench (40) through the silicon layer (36) and the buried oxide layer (34) to expose a portion of the silicon substrate (32); and
- 15 forming a contact (44) in the trench.
8. The method of claim 6, wherein the contact (44) forms an aperture (46) of the SOI photodiode (30).
- 20 9. A silicon-on-insulator (SOI) photodiode (10; 30), comprising:
- a silicon substrate (12; 32) having a first portion doped with a first dopant type and a second portion doped with a second dopant type, the first and second portions forming a pn-junction;
- a buried oxide layer (14; 34) formed on the silicon substrate;

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a silicon layer (16; 36) formed on the buried oxide layer, wherein an amount of incident light passing through the SOI photodiode to the silicon substrate with respect to wavelength is proportional to a thickness of the silicon layer;

- a field oxide layer (18; 38) formed on the silicon layer, wherein a thickness of the
5 field oxide layer controls the thickness of the silicon layer;

a trench (20; 40) extending to the silicon substrate; and

a contact (24; 44) formed in the trench.

10. The SOI photodiode (30) of claim 9, wherein the pn-junction is a vertical pn-junction.
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11. The SOI photodiode (30) of claim 9, wherein the proportion of incident light passing through the SOI photodiode to the silicon substrate (32) is given by $e^{-a_{\lambda}x}$, where a_{λ} is an absorption coefficient of the silicon layer (36) and x is the thickness of the silicon layer.

- 15 12. The SOI photodiode (30) of claim 9, wherein the contact (44) forms an aperture (46) of the SOI photodiode.

13. A method of forming a silicon-on-insulator (SOI) photodiode (10; 30), comprising:
providing an SOI structure including a silicon substrate (12; 32), a buried oxide
20 layer (14; 34) formed on the silicon substrate; a silicon layer (16; 36) formed on the buried oxide layer, and a field oxide layer (18; 38) formed on the silicon layer;
adjusting a thickness of the silicon layer by adjusting a thickness of the field oxide layer, wherein an amount of incident light passing through the SOI photodiode to the

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silicon substrate with respect to wavelength is proportional to the thickness of the silicon layer;

forming a trench (20; 40) to expose a portion of the silicon substrate; and

forming a contact (24; 44) in the trench.

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14. The method of claim 13, wherein, prior to forming the contact (24), doping the exposed portion of the silicon substrate (12) with a dopant to form a pn-junction.

15. The method of claim 13, wherein the silicon substrate (32) comprises a vertical pn-

10 junction.